The Citrus Industry
FLORIDA'S EXCLUSIVE CITRUS MAGAZINE...
Vol. 23 — No. 9 SEPTEMBER, 1942 15 Cents A Copy

Early Diagnosis Of Magnesium Deficiency In Florida Citrus ....

BY
B. R. FUDGE
Associate Chemist, Citrus Experiment Station, Lake Alfred, Fla., at Meeting of Florida State Horticultural Society.

When the first visual symptoms of magnesium deficiency appear in grapefruit foliage it is too late to apply magnesium fertilizers to trees with the hope of preventing further development of the typical leaf pattern of severe deficiency. This is apparently due to a time factor which is needed for magnesium to become absorbed by the roots and elaborated into organic compounds in the leaves and then to be transported into the fruit which is reaching maturity. Thus, in the presence of a developing magnesium deficiency the grower and especially the trees are faced in late summer with the condition so aptly stated today by the expresssion "too littile and too late."

The purpose of this paper is to show that it is impossible to anticipate the appearance in the fall of a deficiency of magnesium in the foliage by analyzing the spring flush of growth as late as April at which time the size of the new crop can be estimated.

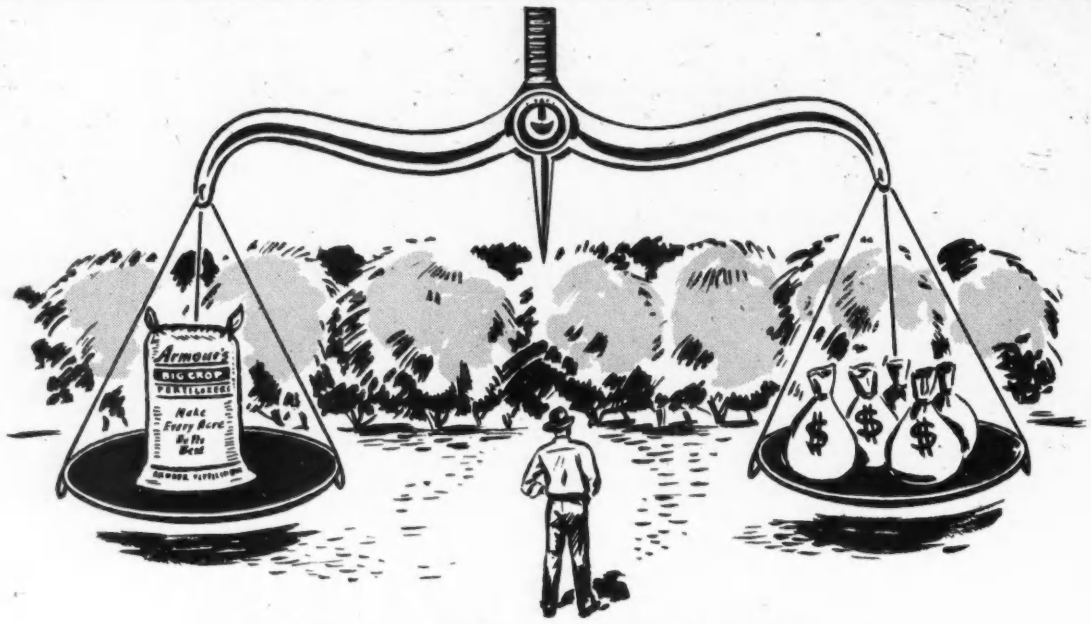
I wish to state at this time that the analytical data presented are based upon results obtained with standard chemical methods and that no quick field test has yet been devised whereby the magnesium determinations could be made directly in the field. Standard methods are slow in that they require the removal of several elements that are present in the foliage before the determination of magnesium can be made. However, when some reliable and specific reagent for magnesium is found, this work indicates some more rapid method may be useful as a diagnostic measure.

Data

In the fall of 1937 an experiment was started at the Citrus Station in which soluble magnesium was applied on the unit basis to four varieties of grapefruit in a series of duplicate plots receiving 0, 2 and 4 units of MgO in the three annual applications of mixed fertilizer. Some of the plots received ground calcium limestone once each year to give the fertilizer an equivalent basicity of 300 pounds per ton and to roughly control the soil pH between 5.5 and 6.0. However, this pH range was only attained in the third year of the experiment. No dolomite was used and all magnesium was applied as magnesium sulfate. Also, some of the plots received 25 to 40 percent organic nitrogen fertilizer and others received all inorganic nitrogen but all received the same poundage of nitrogen, phosphorus and potash.

Data on the magnesium content, expressed as percent of the dry matter in the foliage, and on the yield of two varieties of grapefruit, Duncan and Marsh, are presented in this paper. The average magnesium content of Duncan foliage taken from trees in duplicate plots is shown in Figure 1 for each treatment over the period, August, 1938, to September, 1940. The graphs are presented in an ascending order of magnesium content of the fol-

(Continued on page 4)



Armour's Helps Your Trees Store Up Winter Energy: Source of Future Profits

Experienced growers know it's vitally necessary to harden up their citrus trees for winter, with a fall fertilizer application. They know how energy, stored up during the winter months, can affect the juice-quality, texture and appearance of next season's pick.

With future profits at stake, thousands of Florida growers have made it a rule to use Armour's BIG CROP: They've found this good fertilizer is rich in major and minor plant foods — that it goes right to work, then stays at work — that it CONSISTENTLY helps produce better yields. You too will find Armour's a paying investment, in these days when big, quality yields are demanded for our people in war.

This fall, profit from other growers' experience by using BIG CROP: For the citrus grove or vegetable bed, there's a proven Armour analysis to help make YOUR work count for more.

Your Armour Field Representative Can Help Solve Your Citrus Problems....

Your Armour field representative can not only suggest an analysis to help your grove do its best: From long experience with Florida citrus he can help solve any problems of grove care or cultivation. Whenever you need assistance, drop this office a card: Armour's representative will gladly visit you, and discuss your problems without obligation.

Armour's
BIG CROP
FERTILIZERS

ARMOUR FERTILIZER WORKS

Jacksonville, Florida

The Citrus Industry
EXCLUSIVE SPECIALIZED CITRUS PUBLICATION
Issued Monthly
Representative of every interest
Representing no special interest

Publication office at Bartow, Florida. Entered as second class matter February 16th, 1920, at the post office at Tampa, Florida, under the act of March 3, 1879. Entered as second class matter June 19, 1933, at the post office at Bartow, Florida, under act of March 3, 1879.

Cost of Control Measures for The Citrus Rust Mite...

MAX R. OSBURN, U. S. D. A., Bureau of Entomology and Plant Quarantine, in Journal of Economic Entomology

In Florida, the citrus rust mite (**Phyllocoptes oleivorus** Ashm.) is controlled almost entirely by applications to trees and fruits of sulfur in sprays or dusts. The sprays may contain lime sulfur solution, wettable sulfur, dry lime sulfur, or combinations of these materials, and conditioned dusting sulfurs of different fineness and purity are applied in dry form. Most of these sulfur sprays and dusts are effective against rust mites and in preventing russeting, but some are effective over longer periods of time than others. The differences in cost between different materials and spray programs are important to growers. The cost is affected by the price of insecticides that make up the treatment, the method of application, labor, and equipment depreciation costs, quantity of material applied, and the number of applications per season.

Source of Cost Data.—Many experiments involving groves have been conducted at the Orlando, Florida, laboratory during the last four years to improve control methods used against the rust mite on orange trees. In this work accurate records were kept of the cost of materials, the average amount of material per tree for each application, and the number of applications necessary per season for adequate control. The treatments for which cost data are given were selected from various rust mite experiments carried on from 1936 to 1939, inclusive, and information is given only on more or less standard sulfur spray mixtures and sulfur dusts which have been used commercially for the control of rust mites. All materials were applied with the same power sprayer or power duster, and the equipment employed with each outfit was similar throughout all tests. The trees were treated thoroughly, and amounts of material were used adequate to give satisfactory rust-mite control. The data presented were taken from experiments conducted in 1936 on Parson Brown, an early variety, and on Valencia, a late variety, during subsequent years. The Parson Brown trees were eleven years old in 1936, and in 1937 the Valencia groves had been planted twelve years.

The costs of spray and dust materials and the estimated expenses of application are listed below:

Lime sulfur (32° Be.)	$0.14 per gal.
Wettable sulfur, 325-mesh, 90% pure sulfur	.035 per lb.
Wettable sulfur, 4,000-mesh, 99.5% pure sulfur	.06 per lb.
Dry lime sulfur	.095 per lb.
Dusting sulfur, 325-mesh, 93% pure sulfur	.02 per lb.
Dusting sulfur, 2,000-mesh, 98.5% pure sulfur	.047 per lb.
Cost of spraying (labor and depreciation	.01 per gal.
Cost of dusting (labor and depreciation)	.005 per tree

Spray and dust materials have been purchased in large enough quantities for the costs to be comparable with prices to growers in central Florida. The expense of making experimental applications, however, is higher than cost to growers. In deriving the cost estimates given above, after an investigation of grower and commercial expenses, a flat charge of 1 cent per gallon of material was decided upon for making a spray application and ½ cent per tree for a dust application. The charge for a dust application was based on a tree unit rather than quantity of material applied, because large quantities of dust can be applied with very little more labor or time than small quantities, but the application of large amounts of spray

(Continued on page 7)

[1] Acknowledgement is due Herbert Spencer for helpful criticism during the preparation of this paper.

EARLY DIAGNOSIS OF MAGNESIUM DEFICIENCY IN CITRUS

(Continued from Front Cover)

iage from left to right. The variations in the fertilizer programs used and the condition of the foliage at the time of maximum "crop strain" are shown at the bottom. The object of presenting the graphs in Figures 1 and 2 is to show the effect which the application of varying amounts of soluble magnesium have had upon the magnesium content of the foliage of the two varieties even as early as August, 1938. It will be noted that the application of four units of soluble magnesium has effectively increased the magnesium content over that produced by two units at the respective sampling periods and when no magnesium was applied a very low magnesium content of the foliage resulted and severe symptoms of magnesium deficiency appeared.

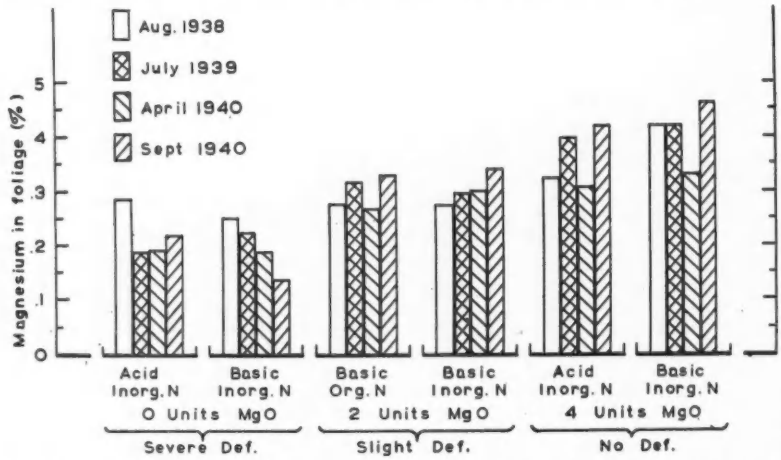


Figure 1.—The effect of the application of soluble magnesium in mixed fertilizer upon the magnesium content of Duncan grapefruit foliage.

The magnesium content of Marsh foliage is shown in Figure 2 by graphs arranged in the same manner as those of Figure 1 and for the same sampling time. The magnitude of the column indicating magnesium content of Marsh foliage is very similar to that for Duncan foliage in relation to the amount of soluble magnesium applied in the fertilizer. The one distinct difference between the Duncan and the Marsh trees is that the latter are practically free of magnesium deficiency even where only two units of soluble MgO are applied while some symptoms appeared on heavily-fruited Duncan trees which received two units. This is true even though the Marsh trees have yielded much larger crops throughout the period of this experiment to date. However, this is partially due to the fact that the Marsh trees are larger; a condition which has gradually arisen since the grove was set. The trees in plots receiving no soluble magnesium in the fertilizer show a rather severe magnesium deficiency which is indicated by the foliage analyses shown in Figure 2. Thus, it may be concluded from the results presented in Figures 1 and 2 that it should be possible by analyses of foliage, taken sufficiently early in the current crop year, to determine the predisposition of the trees to magnesium deficiency.

In order to clarify this point leaf samples were analyzed in both April and September, 1940. The results of these two samplings, one early in the crop year and the other late or after the "crop strain" effects had appeared as well as the average yield of fruit per tree for the same year are given for Duncan and Marsh grapefruit in Figures 3 and 4, respectively. We know that the advent of the symptoms of magnesium deficiency is closely related to the crop being produced but these data show clearly that the size of the crop is of secondary importance as compared with the amount of magnesium in the foliage in determining whether or not a tree will develop the symptoms of magnesium deficiency. This fact form the basis for the contention that early diagnosis of an impending magnesium deficiency can be based upon the amount of magnesium found within the trees as measured by leaf analysis. For instance, the trees which received no magnesium in the fertilizer and which developed the most severe magnesium deficiency symptoms of any trees in the experiment have also produced the lowest average yield of fruit. This leads to the conclusion that the predisposing factor is the amount of magnesium in the tree not the amount of crop being produced.

The very definite effect of cropping can be observed only if there is a limitation in the supply of magnesium for the fruit. The yield of the 1940-41 crop year is comparatively the heaviest of the three-year period (1939-40 1941-42) and is the year of greatest "crop strain." The data show clearly that a grood crop may prevent an increase or even reduce the magnesium content of the foliage in September as compared with that of April if the amount of magnesium in the foliage is low as in the case of trees receiving no magnesium in the fertilizer. Thus, the basic inorganic plots which received no magnesium in the fertilizer show a reduction of magnesium in the Duncan foliage (Figure 3) in September while producing about 460 pounds of fruit per tree. In other plots which received two or four units of soluble magnesium in the fertilizer and are producing

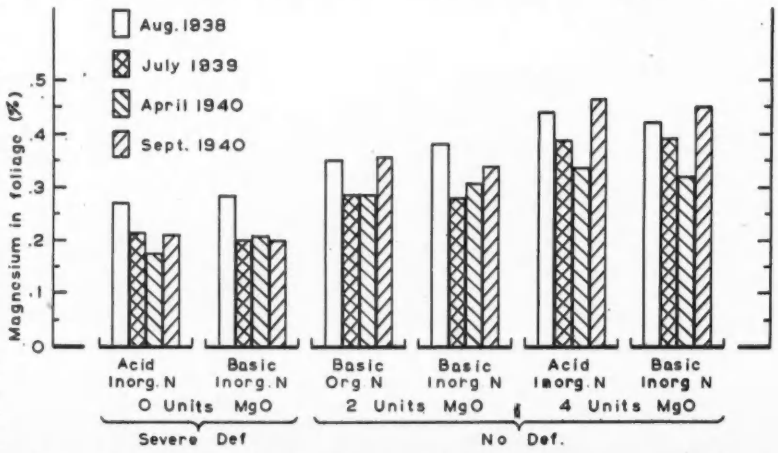


Figure 2.—The effect of the application of soluble magnesium in mixed fertilizer upon the magnesium content of Marsh grapefruit foliage.

about the same amount of fruit per tree (460 pounds), there are increases in the magnesium content of the foliage in September. This indicates that the magnesium content can be raised in the foliage of seedy grapefruit to a level which will prevent the symptoms of magnesium deficiency from appearing even in the presence of a heavy crop.

If the magnesium content of the moisture-free spring flush foliage is greater than 0.35 percent magnesium. The yield on Marsh trees in many of the plots is approximately double that of the corresponding Duncan trees. As already noted the Marsh trees are much larger than the trees of the seedy varieties. This difference in size is due principally to the effects of inadequate magniesum before the start of this experiment in the fall of 1937. Since the magnesium content of the foliage in September is sharply increased over that shown in April even though

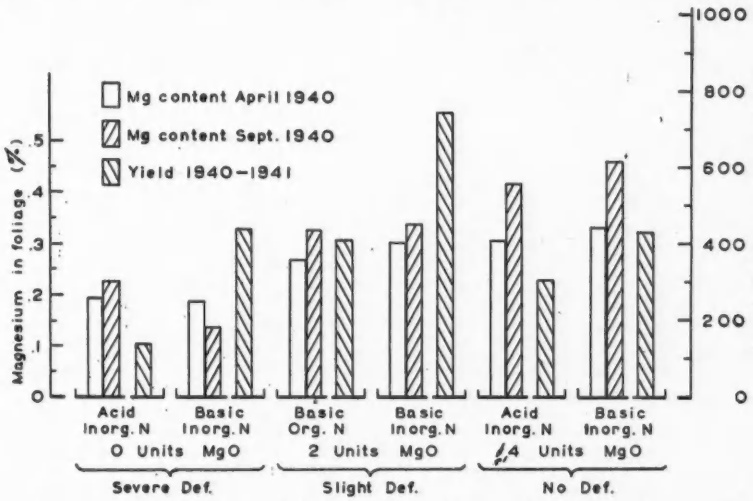


Figure 3.—The relation of foliage composition and yield to the occurrence of magnesium deficieny in Duncan grapefruit foliage.

percent magnesium, which as already noted, does not prevent the appearance of magnesium deficiency in the foliage. However, these data illustrate again the ability of Marsh to produce crops more efficiently than seedy varieties, that is, the magnesium requirement per unit quantity of fruit is less.

Discussion

Although the minimum value of 0.35 percent magnesium is purely arbitrarily set and may need revision from time to time, these data indicate quite definitely that it is possible to determine by analysis of the new spring foliage the probability of the occurrence of magnesium deficiency four or five months later; and it should be possible by amending any deficiency indicated by the spring magnesium analyses, to prevent the impending development of the deficiency symptoms of magnesium. The practical use of this information is limited by the lack of a reliable and quick method for the determination of magnesium.

Any grower or production manager who has had control over production for a few years should know approximately what is needed by the trees as based upon past performance. However, when a new or little known grove enters the picture, it is quite evident that nothing short of foliage analysis can determine the magnesium status and show whether an immediate application of magnesium is advisable. Under conditions of this experiment in which three to four units of nitrogen are used, these results indicate that a maintenance fertilizer program which will prevent the appearance of deficiency

(Continued on page 14)

sium (Mg) in April and soluble magnesium to the extent of two to four units of MgO are contained in the summer fertilizer together with three to four units of N, these data indicate that no deficiency of magnesium will occur in the foliage that fall. Likewise, if the magnesium content is less than 0.2 percent, the foliage of seedy varieties of grapefruit will show severe magnesium deficiency in the fall even while producing a comparatively small crop.

The arbitrary minimum value of 0.35 percent given here may prove to be somewhat low in seasons of extremely heavy seedy crops. It should be noted that the 1940-41 crop on these Duncan trees was not exceptionally large. Unfortunately, the yields of fruit on these plots have been influenced greatly by uncontrolled factors such as severe cold and dry weather. These factors can now be largely controlled and yield should become a more reliable criterion of the treatments.

Commercial control of magnesium deficiency in March (Figure 4) has been attained in all plots receiving soluble magnesium in the fertilizer. Severe deficiencies exist in the trees of plots which receive no magnesium (Mg) in the dried foliage is indicated for Marsh. Upon the basis of these analyses, this value (0.35) appears to be quite adequate for Marsh. In the plots where no magnesium is applied, the foliage dry matter of Marsh contains about 0.2

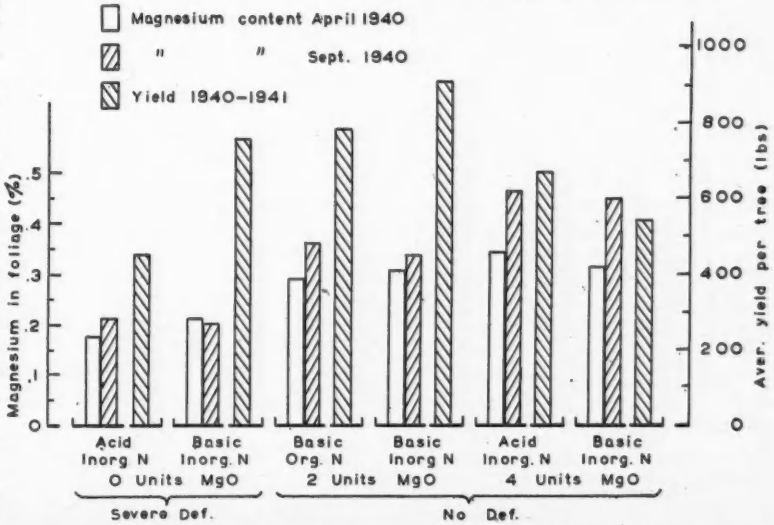


Figure 4.—The relation of foliage composition and yield to the occurrence of magnesium deficiency in Marsh grapefruit foliage.

The Citrus Industry

with which is merged The Citrus Leaf
Exclusive publication of the Citrus Growers and Shippers

Publication office 550 North Broadway, Bartow, Florida
Telephone ——— 269

Published Monthly by
ASSOCIATED PUBLICATIONS CORPORATION

S. L. FRISBIE - - - - - - - - - President-Editor
S. LLOYD FRISBIE - - - - Sec.-Treas.-General Manager
LOYAL FRISBIE - - - - - - - Business Manager
A. G. MANN - - - - - - - - Production Manager

Subscription, $1.00 per year in advance
Outside Continental United States, $2.00 in advance

THE CITRUS OUTLOOK

Owing to the unusual conditions created by the global war, there has been and still is a feeling of uncertainty among Florida citrus growers as to the outlook for the season soon to open. The labor situation, the transportation problem, the scarcity of certain materials in the canning industry, have given rise to a feeling of uneasiness on the part of many growers.

It is true that these and other unusual conditions must be given consideration by citrus growers. They are problems which must be met, and upon their proper solution depends the success of the coming season.

As to the labor situation, conditions at the moment appear less serious than had been feared. True the armed forces and war industries have absorbed many grove and packing house workers, but this loss may in part be overcome by the employment of additional women, particularly in the packing houses. Then, too, the federal government stands ready to lend a helping hand by transferring labor from other industries or by the importation of labor if found necessary.

Pointing to California as an example, C. C. Commander, general manager of the Florida Citrus Exchange, who has just returned from an inspection trip to that state, says that the removal of Japanese from California deprived the growers of that state of their principal source of labor. They lost their "okies" too by reason of the gas and rubber shortage. Yet California despite this handicap, shipped a greater volume of fruit than ever before. He believes that Florida, with slighter handicap, can do at least equally well.

The transportation problem presents another handicap of even greater importance. With no boat service available, shippers must rely exclusively on the railroads and trucks. The railroads are overloaded with the demands of our armed forces and trucks are operating under restricted conditions. We must remember, however, that Federal agencies are doing everything possible to encourage the use of citrus fruits, both among the armed forces and the civilian population. Transportation, particularly to the army camps, will doubtless be provided, and the distance to most of these camps and to heavily populated civilian centers is less from Florida than from other producing centers.

Storage supplies of canned citrus fruits and juices is practically exhausted, and while the shortage of tin may stand in the way of canning operations at full capacity, we may be sure that canners will be in the market for every box of fruit their supply of tin will permit them to handle. In the meantime, shortage of canned fruits and juices will call for increased consumption of fresh fruit.

Due to shipping conditions in the Caribbean, Gulf and Atlantic, the movement of grapefruit from the Isle of Pines will doubtless be greatly curtailed, thus removing to some extent at least the early competition from that quarter. These same shipping conditions operate to lessen the supply of bananas, one of the chief competitors of citrus fruits, while apples, another competitive fruit, are selling at higher prices than a year ago.

Taken all in all, it is the belief of most informed factors in the industry that the approaching shipping season holds much of promise to the Florida citrus grower if proper attention is given to the handling of the situation.

First, of course, the grower must concern himself with the quality of the fruit offered the market. Only fruit of the highest quality must be shipped. The fruit must be properly handled from the tree to the shipping shed and it must be distributed in an orderly manner, so that there may be no gluts and no famine in any market — at least none for which the grower is responsible.

Recognizing to the full the unusual and, in some respects, trying conditions under which the coming crop must be marketed, we are firm in the belief that if properly handled the citrus season of 1942-43 will be one of profit for the citrus growers of Florida — and we don't believe that growers should be in any hurry to dispose of their crop.

CITRUS CONCENTRATES

Many Floridians, even many Florida citrus growers, may not be aware of it, but Florida has in operation four citrus concentrate plants, some of them the largest plants of the kind in the world. In a very short time these plants will be in full operation on the crop of 1942-43 and will be consuming hundreds of thousands of boxes of Florida oranges.

Most of the products of these plants will be exported, largely to Britain, for use of our own and our allies' armed forces, although some doubtless will be made available for the underfed population of the British Isles.

These concentrate plants represent an investment of millions of dollars, and almost overnight they have become an important factor as an outlet for the product of our citrus groves. With shipping conditions as they are, these concentrates must provide the chief source of supply of citrus fruits for the armed forces and civilian populations of unoccupied Europe.

Florida citrus growers have done their full share toward keeping 'em flying and rolling by making liberal contributions of scrap rubber and scrap metal.

COST OF CONTROL MEASURES FOR THE CITRUS RUST MITE

(Continued from page 3)

material ordinarily requires more time and labor than the application of smaller amounts. These application costs cover labor and depreciation of spraying and dusting equipment and are used uniformly in the calculations to give a fair comparison of the materials used and the spray programs followed.

The costs of the various spray and dust programs have been calculated from the prices of insecticides used, the estimated costs of application and depreciation of equipment as given above, the average amount of material applied to each tree per application, and the number of applications per crop. These data, based on a tree unit per crop, are given in table 1.

Discussion.—All treatments recorded in table 1 were effective in controlling rust mites, but some materials adhered to fruit and foliage longer than others, thereby reducing the number of applications necessary. Variations in tree size, density of foliage, and the efficiency of operator were responsible for differences in the amounts of material applied per tree. Variations in infestation of rust mites in different groves during the same years and in the same grove in different years, and in the time of maturing of fruits were also responsible for differences in the number of applications of the same material.

Table 1 — Cost of rust-mite control on orange trees, Orlando, Fla., 1936-39

Treatment*	Year	Grove No./	Material, Gal. Per Tree Per Application	Applications Required	Total Cost Per Tree
Sprays					
Lime sulfur 2 gal.	1936	1	6.5	3	$0.25
	1937	1	8.3	5	0.53
	1937	2	8.7	4	0.45
	1938	1	7.1	4	0.36
	1938	2	5.9	5	0.38
	1939	1	7.4	3	0.28
Lime sulfur 2 gal.+wettable sulfur (325 mesh) 10 lb.	1936	1	6.5	2	0.21
	1937	1	8.2	4	0.53
	1937	2	6.8	3	0.33
	1938	1	7.0	4	0.46
	1938	2	6.7	4	0.44
Lime sulfur 1 gal.+wettable sulfur (325 mesh) 5 lbs.	1937	2	8.1	3	0.32
	1938	1	7.3	4	0.38
Lime sulfur 2 gal.+wettable sulfur (325 mesh) 5 lbs.	1937	2	8.1	3	0.35
	1939	1	7.0	3	0.31
Lime sulfur 1 gal.+wettable sulfur (325 mest) 10 lb.	1937	2	8.1	3	0.36
Lime sulfur 2 gal.+wettable sulfur (4,000 mesh) 5 lb.	1939	1	7.9	2	0.25
Dry lime sulfur 5 lb.	1937	2	8.1	3	0.36
	1938	1	6.6	5	0.49
Dry lime sulfur 5 lb.+wettable sulfur (325 mesh) 5 lb.	1937	2	8.1	3	0.40
Dry lime sulfur 8 lb.+wettable sulfur (325 mesh) 5 lb.	1937	2	8.1	3	0.47
Wettable sulfur (325 mesh) 10 lb.	1939	1	7.2	3	0.29
Wettable sulfur (4,000 mesh) 10 lb.	1938	2	5.8	4	0.37
	1939	1	7.6	3	0.36
Dusts			Pounds		
Sulfur (325 mesh)	1938	2	0.74	6	0.12
	1939	1	1.00	4	0.10
Sulfur (2,000 mesh)	1939	1	0.50	4	0.11

* Quantities are per 100 gallons for spray mixtures.
/ All the trees treated were in Valencia groves except in 1936, when Parson Brown groves were used.

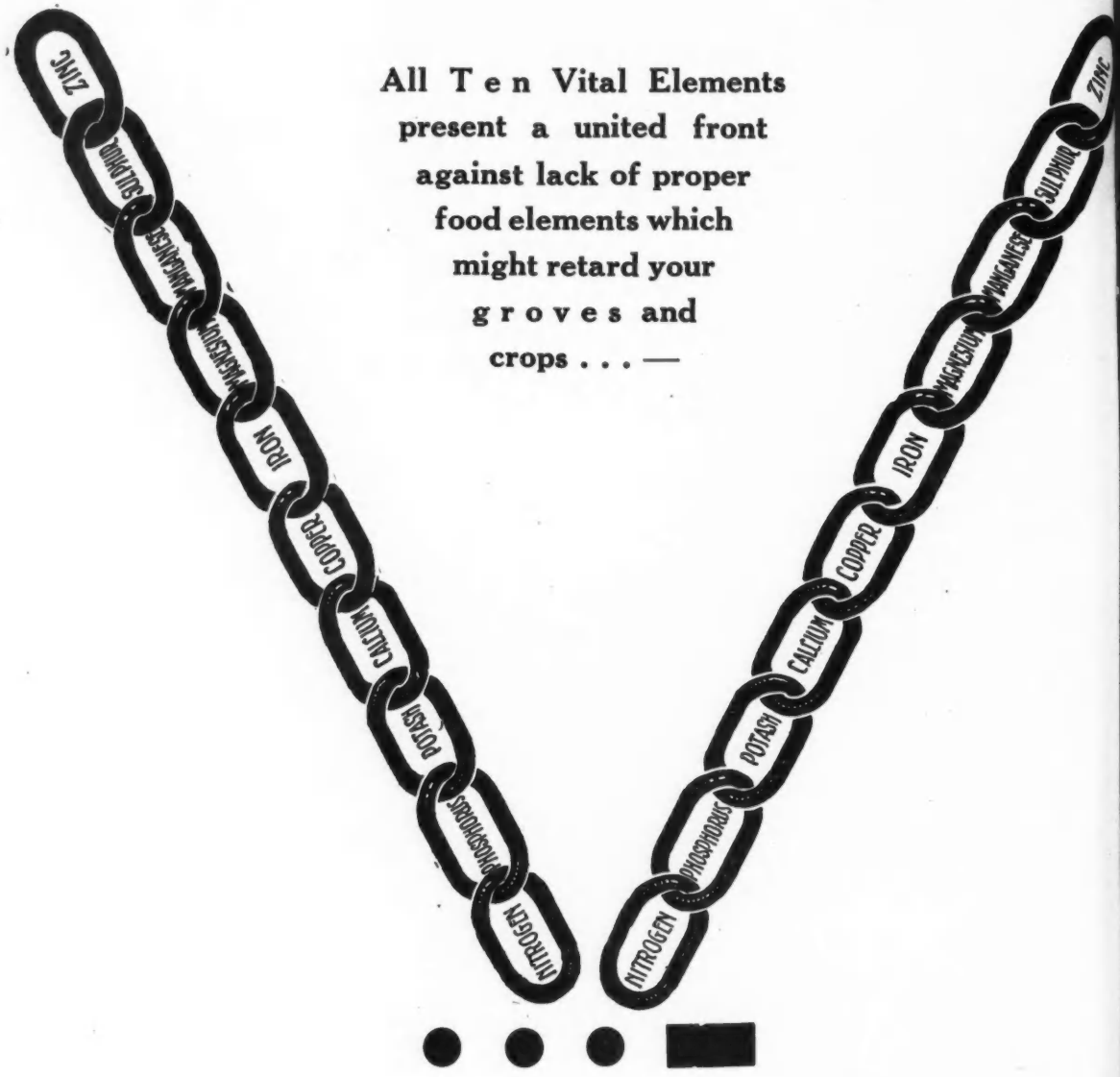
In 1936, in the Parson Brown grove, two applications of lime sulfur plus wettable sulfur at a total cost of 21 cents per tree were less expensive than three applications of lime sulfur alone, which cost 25 cents. In the No. 1 Valencia grove in 1937 five applications of lime sulfur and four applications of lime sulfur plus wettable sulfur each cost 53 cents, even though slightly more of the first spray was used in each application. The cheapest schedule in the No. 2 grove during 1937 was three applications of lime sulfur, 1 gallon, plus wettable sulfur, 5 pounds, at a cost of 32 cents. Three applications of lime sulfur, 2 gallons, plus wettable sulfur, 10 pounds, cost 33 cents although less spray was used in each application. Other treatments in this grove were more expensive, the greatest cost being 47 cents for three applications of dry lime sulfur, 8 pounds, plus wettable sulfur, 5 pounds.

In grove No. 1 in 1938, a schedule of four applications of lime sulfur alone at a total cost of 36 cents was cheaper than four applications of two lime sulfur and wettable sulfur combinations, or five applications of dry lime sulfur. In grove No. 2 during the same year, a program of six applications of 325-mesh dusting sulfur costing 12 cents per tree was much cheaper than the two least expensive spray treatments — five applications of lime sulfur alone which cost 38 cents and four sprays of 4,000-mesh wettable sulfur, 10 pounds, which cost 37 cents. Four sprays of lime sulfur, 2 gallons with wettable sulfur (325-mesh), 10 pounds, cost 44 cents. During 1939 in grove No. 1, 325-mesh and 2,000-mesh dusting sulfurs were the cheapest. The finer dust was slightly more expensive, although only half the quantity was needed in each of four applications to cover trees of similar size. Lime sulfur plus wettable sulfur at a cost of 25 cents was the cheapest spray mixture used during the season in this grove.

Returns from Rust Mite Control—Fruit yield records taken at harvest time during the course of the experimental work showed that controlling the rust mite increased the production of oranges on an average 0.63 box per tree. In 1936, 1937, and 19-

(Continued on page 11)

Every Florida Grower Is A
Of The All-Out "Second F



All Ten Vital Elements present a united front against lack of proper food elements which might retard your groves and crops . . . —

Superior Ferti

Phone Y-1623

G. D. [illegible]n,

Factory and Office East Broad[illegible] At

High-Powered Orange Juice

By FLOYD F. HEDLUND in "Marketing Activities"

When nutritionists tell you that orange juice is about 85 per cent water, your natural response is probably "So what?" As a confirmed drinker of this good old breakfast cocktail, yau are mainly concerned with its taste or its eye-opening properties, as the case might be. And you may go a step farther and argue that the juice is one of the best known sources of Vitamin C — so to heck with the water.

But officials in charge of sending Lend-Lease products to our allies take an entirely different view of the matter. They are the fellows who must make every cubic inch of shipping space count, and water is one thing that adds only to the weight and bulk of the cargo without adding to nutritional value. This leaves only one solution to the problem: The excess moisture must be removed. And that is just what the citrus industry is doing.

A good start in the way of turning out concentrated orange juice had already been made before the war started. The product was on the market as a base for soft drinks, but when a shortage of shipping space developed a couple of years ago — that was when the British were standing the Germans off single-handed— the manufacturers really got busy. Up to April 1 about 380,000 gallons of the high-powered product had been shipped, and this equivalent to approximately 3 million gallons of single-strength juice.

Orange Juice Rationed In England

It is important to remember that concentrated orange juice is not a luxury product to whet the British appetites or to be used for a base for soft drinks. The products is furnished free to little children — those under the age of 2 years — because they have a real need for ascorbic acid or Vitamin C, and concentrated orange juice provides a practical source of this dietary requirement.

The distribution in England is carried on under rigid official controls. "Pharmaceutical houses," which we call wholesale drug firms in this country pack the juice in six-ounce bottles after it has been blended and standardized and distribute the product to various food centers throughout the United Kingdom. The six-ounce bottle is calculated to last a given time and each family is rationed. The juice is diluted or "reconstituted" with water in the home.

The flavor of concentrated juice varies with the type of fruit used and the manufacturing process employed. Much of the concentrated product compares favorably with fresh orange juice; but some, particularly that made from navel and certain other types of winter oranges, has a rather bitter taste. Fortunately British people prefer a touch of this flavor in their foods and they have not objected to the taste of the concentrated juice.

To be technical, fresh orange is concentrated by evaporation under a vaccum that ranges from 26 to 29 3/4 inches. The fresh product which ordinarily contains from 10 to 15 percent total solids, is "boiled down" so that it ends up with 65 or 70 percent solids. The asorbic acid content is reduced only slightly during the process and the finished product contains more than 90 percent of the acid that was in the original juice. Ordinarily the juice is pasteurized during the process, but nothing is added—no sugar nor no preservatives. The high degree of concentration adds to the keeping quality of the juice.

Most of the concentrating plants are in California, but Florida has one, and two more are under construction.

Cull Oranges Used

Cull oranges are used in the manufacture of concentrated juice, but don't assume right off that such fruit is unwholesome. The fruit used may be misshapen or blemished, but the quality of the juice is just as good as that from higher grade fruit and it contains its full quota of vitamins. A record orange crop of about 84 million boxes is expected to supply processing plants with an abundant supply of off grade fruit during coming months, and it is believed that we will be able to furnish the British all of the juice required.

All in all, the purchase of concentrated orange juice for Lend-Lease shipment has been very satisfactory. In the first place, we have provided a good market for cull oranges and thus have contributed to the incomes of domestic producers. Second, if we were to furnish single-strength orange juice alone, it would be impossible to provide Great Britain with the quantity required—shipping space and tin are too scarce. Furthermore, the distribution problem in Great Britain is said to be such that it would be impossible to supply current requirements if it were necessary to handle only fresh fruit. The way it is, consideration is being given to expanding the use of concentrated juice to include British school children as well as infants.

COST OF CONTROL MEASURES FOR THE CITRUS RUST MITE

(Continued from page 7)

39, a large grower in central Florida received for early oranges, of which Parson Brown is a leading variety, averages of $1.91, $1.50, and $1.16 per box, respectively, or an average of $1.49 for the three years. The increased production of 0.63 box per tree as the result of controlling rust mites, computed at $1.49 per box, results in an increased return of approximately $0.93 a tree, which would exceed by $0.68 per tree the cost of the more expensive rust mite control schedule for Parson Brown oranges given in table 1. In the same years Valencia oranges brought the same grower averages of $2.81, $1.16, and $1.54 per box, or a three-year average of $1.65 per box. The increased production of 0.63 box per tree, calculated at $1.65 per box, results in an increased return of approximately $1.03 per tree, which would exceed by $0.50 per tree the cost of the most expensive schedule given in table 1.

Summary.—Costs of sulfur spray and dust treatments for the control of the citrus rust mite (**Phyllocoptes oleivorus**, Ashm.) in Florida have been calculated from data collected over a period of four years from experimental plots in six orange groves.

In general, control of rust mites, and of russeting, by dusting with sulfur is very much cheaper than by spraying with any of the ordinary spray combinations, ranging from 10 to 12 cents per tree for dusted Valencia compared to 25 cents per tree for the cheapest spray program.

Addition of wettable sulfurs to lime sulfur reduced the number of applications required in a season, but during a heavy rust mite year on Valencia trees a schedule employing lime sulfur alone was cheaper, although an extra application was required. Generally, the addition of 5 pounds of wettable sulfur to lime sulful solution gave as good protection as the addition of 10 pounds, and was cheaper.

Dry lime sulfur sprays were more costly than most of the other comparable spray treatments.

Experimental procedure with all the above treatments gave commercial control of rust mites and prevented russeting of fruit equally well.

Controlling rust mites increased fruit production, resulting in a profitable return, the increased return for Parson Brown oranges being 68 cents per tree and for Valencias 50 cents.—12-6-39.

The LYONIZER

Department

COMPILED BY THE LYONS FERTILIZER CO.

Horticultural Hints

J. H. Rickborn

Your Federal Government is calling on you to produce bumper crops of all varieties of food. We are obligating ourselves daily to do more and more for those countries that are not in position to help themselves, and therefore you understand that we MUST produce bumper crops of quality food products. We are faced with the problem of labor in our effort to produce more, but it is here that the American grower will always show his ingenuity and when called on will in the final analysis produce unexpected results. In this call for increased production the growers of Florida are placed in a conspicuous position, in that they are called on for fruit and vegetables, **fresh** fruit and vegetables, when most of the other sections of our Country are closed in with winter. Regardless of any kind of adversity we believe that Florida growers will give to the nation and to our allies the fruits and vegetables that are required by the fighting forces to continue the great job that they have now started in beating hell out of the axis.

Vegetable growers during the past few years have found ways of increasing their yield per acre and at the same time the quality has improved. Now is the time to make every planted acre to do its best, and it is here that the LYONS FERTILIZER COMPANY feels obligated in this fight for production of greater yields per acre. We can and do assure every grower that uses our fertilizers that they will be supplied with the same high quality mixtures that we have always supplied, and we further assure you that we are constantly working to improve on what we know to be the finest mixture that it is possible to manufacture. In connection with supplying quality fertilizer we have a force of field men that are thoroughly capable of advising with growers on any subject pertaining to the economical production of crops. In addition to technical training, these men are all schooled in the practical application of their knowledge. Of course, there are times when they might not be able to give you an on-the-spot answer to some problem but if they cannot, we have the facilities of getting you the proper information at the earliest possible moment.

For the past few years we have seen some spray damage to early varieties of fruit when they were sprayed late in the season. In this connection we particularly want to warn against the use of strong solutions of lime sulphur on Hamlin oranges. The rind of this fruit is very sensitive and very easy to damage. In cases as referred to we suggest for the control of rust mite the use of straight wettable sulphur at increased strength or the use of dusting sulphur.

Reports of Lyons Field Men . . .

SOUTHWEST FLORIDA
F. W. (Felton) Scott

Truck growers are busy with their seed beds for celery, tomatoes, pepper and eggplant. The indications are that we will have a normal planting of these crops. Considerable apprehension is voiced regarding labor for the coming season and this one factor will prevent any increase in acreage. Dry hot weather has made growing seed beds very difficult but recent rains have been of considerable advantage. From the best information that we can get together it appears that we will have an increased acreage of cabbage, potatoes and cauliflower with a decrease in the acreage of lettuce and pepper. Citrus groves are looking very good but during early part of month suffered to some extent from drought.

POLK AND HIGHLANDS COUNTIES
J. M. (Jim) Sample

At this writing this section of the state needs heavy rains in general. There have been some scattered showers but they have not lasted long enough to off-set the heavy withdrawal of soil water by the hot sun. Many irrigation pumps have been running continuously. Some late oil spraying is being finished up now and rust mite are active again. Caution should be exercised when spraying with sulphur on early varieties. Present indications are that this section will produce a normal crop of fruit for the approaching season. It does not appear, however, that any great quantity of the early varieties will be moved to the markets before mid-October. The quality throughout the section will be very good.

HILLSBOROUGH AND PINELLAS COUNTIES
C. S. (Charlie) Little

Citrus groves in this section are in very good condition at this time, with an ample summer growth of fine vigorous foliage. Fruit is sizing up good but every indication is that we will not be able to move much fruit until the middle of October. There is some splitting of fruit throughout the territory but not enough to cause worry. It is pleasing to note the optimistic feeling of growers and without exception we are all anticipating a very profitable season. We are still fighting rust mite as they continue to show up all over the territory.

NORTH CENTRAL FLORIDA
V. E. Bourland

We have had a great deal of discussion in this section regarding the size of our crop of fruit. It seems that we can sum this up by saying that we have some very good crops and some crops that are not so good, but when the total is taken into consideration it appears that we will have plenty of fruit to place on the market during fall and spring. During the early part of August and later we had certain sections in this territory that suffered very badly from lack of rain.

WEST CENTRAL FLORIDA
E. A. (Mac) McCartney

We are making plans in this section to go forward with our fall vegetable crops, and while there is no question about the lack of help, we are going to reduce acreage where it is necessary and then make an effort to have every acre produce the maximum yield. As to the varieties of vegetable crops that will be planted, it now appears that there will be a diversity of crops with each local section specializing in the crop that is particularly suited to the locality. Citrus fruits are showing up well throughout the territory and most growers are hopeful of a successful season.

EARLY DIAGNOSIS OF MAGNESIUM DEFICIENCY IN FLORIDA CITRUS

(Continued from page 5)

symptoms contains about two units of soluble magnesium (MgO). This amount is quite adequate for Marsh and may prove to be adequate for seedy varieties which are gradually becoming free of the symptoms in spite of the fact that the experiment was started with severe deficiency in the trees.

Probably the most important practical point contained in these data relates to the incorporation of magnesium in mixed fertilizer on a unit basis in what may be considered a maintenance program that will control magnesium deficiency in the tree. There are no indications in these data than more than four units of MgO are needed and may, once the program is well established, be held at two or three units. The value of following a specific well-rounded program of citrus fertilization is indicated to avoid the situation of "too little and too late."

CLASSIFIED Advertisements

The rate for advertisements of this nature is only five cents per word for each insertion. You may count the number of words you have, multiply it by five, and you will have the cost of the advertisement for one insertion. Multiply this by the total number of insertions desired and you will have the total cost. This rate is so low that we cannot charge classified accounts, and would, therefore, appreciate a remittance with order. No advertisement accepted for less than 50 cents.